Alg. 2 Warm Up #2-3

Solve using the zero product property:

1. $x^2 - 5x = 0$

2. $(7x - 2)(x + 8) = 0$

3. $x^2 - 4x - 12 = 0$

4. Quick Graph:
$y = -3x + 6$

HW Questions:

1-46. Use any method to find the point of intersection of $f(x) = 3x - 5$ and $g(x) = -4x + 9$.

$3x - 5 = -4x + 9$
$7x = 14$
$x = 2$
$y = 3(2) - 5$
$y = 1$
$(2, 1)$

1-47. Compute for $f(x) = \frac{1}{x}$.

a. $f(\frac{1}{2})$ b. $f(\frac{1}{10})$ c. $f(0.01)$ d. $f(0.007)$

$f(\frac{1}{2}) = \frac{1}{\frac{1}{2}}$

$= 1 \cdot 2$

$f(\frac{1}{2}) = 2$

$f(0.007) = \frac{1}{0.007}$

$f(0.007) \approx 142.9$

1-48. Solve each of the following quadratic equations. If you need help, refer to the Math Notes box for this lesson.

a. $x^2 - 8x + 15 = 0$

b. $2x^2 - 5x - 6 = 0$ (a = 2, b = −5, c = −6)

doesn't factor so use quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-6)}}{2(2)}$

$x = \frac{5 \pm \sqrt{25 + 48}}{4} = \frac{5 + \sqrt{73}}{4}, \frac{5 - \sqrt{73}}{4}$

1-49. Consider the points (–5, 0) and (0, 3).

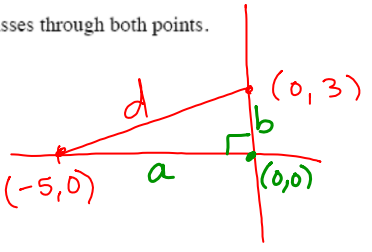
a. Plot the points and find the distance between them. Give your answer both in simplest radical form and as a decimal approximation.

b. Find the slope of the line that passes through both points.

$\sqrt{d^2} = \sqrt{a^2 + b^2}$

$d = \sqrt{(5)^2 + (3)^2}$

$d = \sqrt{}$



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

1-50. Stacie says to Cory, *"Reach into this standard deck of playing cards and pull out a card at random. If it is the queen of hearts, I'll pay you $5.00."* (Note: A standard deck of playing cards contains 52 cards, each of which is unique.)

a. What is the probability that Cory gets Stacie's $5.00?

b. What is the probability that Stacie keeps her $5.00?

Prob = $\frac{\#\text{ of ways to be successful}}{\#\text{ of possible outcomes}}$

a) $P = \frac{1 \text{ Queen of Hearts}}{52 \text{ cards total}}$

$P = \frac{1}{52}$

b) $\frac{51 \text{ cards that are not Queen of } \heartsuit}{52 \text{ cards total}}$

$P = \frac{51}{52}$

1-51. Find the error in the solution at right. Identify the error and solve the equation correctly.

$$4.1x = 9.5x + 23.7$$
$$-4.1x = -4.1x$$
$$5.4x = 23.7$$
$$\frac{5.4x}{5.4} = \frac{23.7}{5.4}$$
$$x = 4.39$$

1-52. Solve each of the following equations.

a. $3.9x - 2.1 = 11.2x + 51.7$

b. $\left(\frac{1}{5}x - 2\right) = \left(\frac{13}{25} - 0.7x\right)$ 25

clear denominators by multiplying both sides by the LCD. 25

$\frac{25}{1} \cdot \frac{1}{5}x - 2(25) = \frac{13}{25} \cdot \frac{25}{1}$

$5x - 50 = 13 - 0.7(25)x$

$+17.5x \qquad +17.5x$

$22.5x - 50 = 13$

$+50 \qquad +50$

$\frac{22.5x}{22.5} = \frac{63}{22.5}$

$x = 2.8$

Yesterday's CP's:

Jason and his team were working on finding the points of intersection of $f(x) = 2x^2 - 5x + 6$ and $g(x) = -2x^2 - x + 30$. He suggested, *"Maybe we could start by looking at the graphs of the functions."*

a. Use your graphing calculator to help you graph $f(x)$ and $g(x)$.

b. Adjust the viewing window so that you can see all of the points of intersection. How accurately can you approximate the coordinates of these points by looking at the graph? Give it a try.

c. Use the "trace" feature to get a more accurate approximation of each of the points.

d. With your team, explore the [CALC] feature of your TI83/84+ graphing calculator. Can you find a way to make the graphing calculator calculate your points of intersection for you? How accurate are your results?

(-2, 24) and (3, 9)

1-43. Aria was in Jason's team. She had another idea and asked, *"Can't we find the points of intersection by comparing the tables of our two functions?"*

a. What did Aria mean? How can you find points of intersection by looking at tables?

b. Use your graphing calculator to make tables for $f(x)$ and $g(x)$. To do this, you will need to explore the [TABLE] and [TBLSET] features of your TI83/84+ calculator.

c. Find all of the points of intersection in the tables. How accurate are these results?

d. Can you think of any circumstances in which using a table might not be an efficient or accurate strategy for finding points of intersection? Explain.

- If your table is set to skip by 1 then a decimal intersection will not show up.
- If the intersection is far away from the start of your table, you could be hunting for a long time.

1-44. Delilah listened to Jason and Aria explain their ideas. She said, *"I thought of another way! We have a method for using the equations to find points of intersection even without the graphing calculator, don't we?"*

a. What method is Delilah referring to?

b. Use Delilah's method to find the points of intersection of these two functions.

$2x^2 - 5x + 6 = -2x^2 - x + 30$

$+2x^2 \quad +x \quad -30 \quad +2x^2 + x - 30$

$4x^2 - 4x - 24 = 0$

$4(x^2 - x - 6) = 0$

$1 \cdot 6$

$2 \cdot 3$

$4(x-3)(x+2) = 0$

$x = 3, -2$

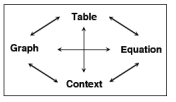
Now plug into one of the original equations to get the corresponding y.

CP's: 1- 53, 55-57

1.2.1 How can I represent a function?

Modeling a Geometric Relationship

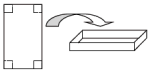
Mathematics can be used to model physical relationships to help us understand them better. Mathematical models can assume the form of a series of diagrams, a situation, a table, an equation, or a graph. In this course, you will be given situations to explore by gathering and interpreting data. You will learn to generalize your information so that you can make predictions about cases that you did not actually test. In this lesson, you will analyze a geometric relationship and look for connections among its multiple representations.



1-53. ANALYZING DATA FROM A GEOMETRIC RELATIONSHIP

Each team will make paper boxes using the instructions given below. Based on the physical models, your team will represent the relationship between the height of the box and its volume in multiple ways.

If it has not been done already, cut a sheet of centimeter grid paper to match the dimensions that your teacher assigns your team. Then, cut the same size square out of each corner, and fold the sides up to form a shallow box (with no lid) as shown below.



Dimensions	
22 cm × 16 cm	18 cm × 10 cm
22 cm × 14 cm	15 cm × 15 cm
20 cm × 15 cm	15 cm × 10 cm
20 cm × 9 cm	12 cm × 9 cm

$y = lwh$

$h = x$

Your Task: As a team you will investigate the relationship between the height of a box (the **input**) and its volume (the **output**). You can build as many boxes as necessary to establish this relationship. Be sure to build all of your boxes out of paper of the same size. Record your information using multiple representations – including diagrams, a table, and a graph. Also record any thoughts, observations, and/or general statements that come up in your discussion of the problem.

Discussion Points

How can we collect data for this relationship?

How much data is enough?

What are all the possible inputs for our function?

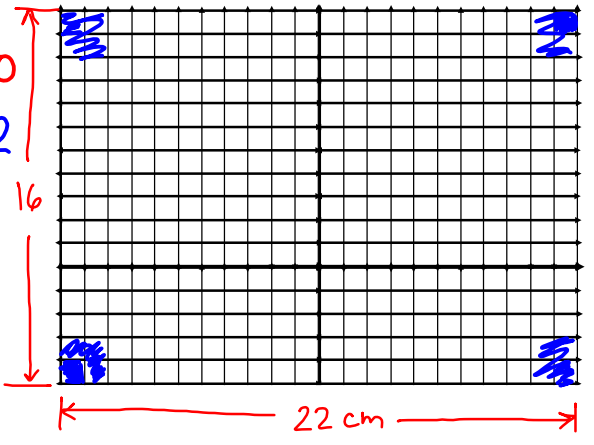
How are the different representations related?

1- 53

$V = l \cdot w \cdot h$ x = height in cm

y = volume in cm^3

x	Volume $y = l \cdot w \cdot h$
0	0
1	$20(14)(1) = 280$
2	$18(12)(2) = 432$
3	

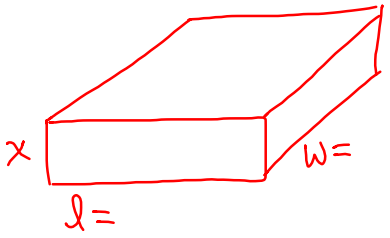


1-55. GENERALIZING

Now you will generalize your results. Generalizing is an important mathematical process. A common way to generalize is to write an equation using algebra.

a. Draw a diagram of one of your boxes. Since this shape is being used to generalize, you want it to represent a relationship between *any* possible input and its output. Therefore, instead of labeling the height with a number, label the height of this box x.

b. Work with your team to calculate the volume (or y-value) for a height of x. It may help you to remember how you calculated the volume when the height was a number and use the same strategy for your new input of x.



1-56. LOOKING FOR CONNECTIONS

Put your $x \rightarrow y$ table, graph, and equation in the middle of your workspace. With your team, discuss the questions below.

As you address each question, remember to give reasons when you can. Also, if you make an observation, discuss how that observation relates to your table, graph, and equation.

a. Is the domain of the relationship limited? That is, are there some input values that would not make sense? Why or why not? How can you tell using the graph? The $x \rightarrow y$ table? Using the equation? Using the boxes themselves (or diagrams of the boxes)?

b. Is the range of the relationship limited? That is, what are all of the possible outputs (volumes)? Are there any outputs that would not make sense? Why or why not?

c. Should you connect the points on your graph with a smooth curve? That is, should your graph be *continuous* or *discrete*? Explain.

d. What is different about your graph for this problem when compared to others you have seen in previous courses? What special points or features does it have?

e. Work with your team to find as many other connections as you can among your geometric models, your table, your equation, and your graph. How can you show or explain each connection?

1-57. What graph do you get when you use the graphing calculator to draw the graph of your equation? Explain the relationship between this and the graph you made on your own paper.

HW: 1-

#61-63, 66, 75, 77

Short Individual Quiz on Thursday.

Zero Product Property
Evaluate: like "find f(3)..."
Graph a line from y = mx + b